RAW SEQUENCE LISTING      DATE: 03/07/2002
PATENT APPLICATION:   US/10/069,040      TIME: 15:35:09

Input Set : A:\pto.vsk.txt
Output Set: N:\CRF3\03072002\J069040.raw

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 3 <110> APPLICANT: Novozymes A/S
 4        Svendsen, Allan
 5        Andersen, Carsten
 6        Borchert, Torben Vedel
 8 <120> TITLE OF INVENTION: Pullulanase variants and methods for preparing such variants
with
 9        predetermined properties
11 <130> FILE REFERENCE: 6072.204-US
13 <140> CURRENT APPLICATION NUMBER: US/10/069,040
14 <141> CURRENT FILING DATE: 2002-02-19
16 <160> NUMBER OF SEQ ID NOS: 40
18 <170> SOFTWARE: PatentIn version 3.1
20 <210> SEQ ID NO: 1
21 <211> LENGTH: 2766
22 <212> TYPE: DNA
23 <213> ORGANISM: Bacillus acidopullulyticus
25 <220> FEATURE:
26 <221> NAME/KEY: CDS
27 <222> LOCATION: (1)..(2766)
28 <223> OTHER INFORMATION:
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36 aac tat acg aat tgg gac gtc tgg atg tgg cct tat cag cct gtt aat     96
37 Asn Tyr Thr Asn Trp Asp Val Trp Met Trp Pro Tyr Gln Pro Val Asn
38               20                  25                  30
40 ggt aat gga gca gct tac caa ttc act ggt aca aat gat gat ttt ggc    144
41 Gly Asn Gly Ala Ala Tyr Gln Phe Thr Gly Thr Asn Asp Asp Phe Gly
42           35                  40                  45
44 gct gtt gca gat acg caa gtg cct gga gat aat aca caa gtt ggt ttg    192
45 Ala Val Ala Asp Thr Gln Val Pro Gly Asp Asn Thr Gln Val Gly Leu
46       50                  55                  60
48 att gtt cgt aaa aat gat tgg agc gag aaa aat aca cca aac gat ctc    240
49 Ile Val Arg Lys Asn Asp Trp Ser Glu Lys Asn Thr Pro Asn Asp Leu
50 65                  70                  75                  80
52 cat att gac ctt gca aaa ggc cat gaa gta tgg att gta caa ggg gat    288
53 His Ile Asp Leu Ala Lys Gly His Glu Val Trp Ile Val Gln Gly Asp
54               85                  90                  95
56 cca act att tat tac aat ctg agc gac gca cag gct gcc gca ata cca    336
57 Pro Thr Ile Tyr Tyr Asn Leu Ser Asp Ala Gln Ala Ala Ala Ile Pro
58               100                 105                 110
60 tct gtt tca aat gcc tat ctt gat gat gaa aaa aca gta cta gca aag    384
61 Ser Val Ser Asn Ala Tyr Leu Asp Asp Glu Lys Thr Val Leu Ala Lys
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64 cta agt atg ccg atg acg ctg gcg gat gct gca agc ggc ttt acg gtt      432
65 Leu Ser Met Pro Met Thr Leu Ala Asp Ala Ala Ser Gly Phe Thr Val
66     130                 135                 140
68 ata gat aaa acc aca ggt gaa aaa atc cct gtc acc tct gct gta tcc      480
69 Ile Asp Lys Thr Thr Gly Glu Lys Ile Pro Val Thr Ser Ala Val Ser
70 145                 150                 155                 160
72 gca aat ccg gta act gcc gtt ctt gtt gga gat tta caa cag gct ttg      528
73 Ala Asn Pro Val Thr Ala Val Leu Val Gly Asp Leu Gln Gln Ala Leu
74             165                 170                 175
76 gga gca gcg aat aat tgg tca cca gat gat gat cac aca ctg cta aaa      576
77 Gly Ala Ala Asn Asn Trp Ser Pro Asp Asp Asp His Thr Leu Leu Lys
78             180                 185                 190
80 aag ata aat cca aac ctt tac caa tta tcg ggg aca ctt cca gct ggt      624
81 Lys Ile Asn Pro Asn Leu Tyr Gln Leu Ser Gly Thr Leu Pro Ala Gly
82         195                 200                 205
84 aca tac caa tat aag ata gcc ttg gac cat tct tgg aat acc tcc tat      672
85 Thr Tyr Gln Tyr Lys Ile Ala Leu Asp His Ser Trp Asn Thr Ser Tyr
86     210                 215                 220
88 cca ggt aac aat gta agt ctt act gtt cct cag gga ggg gaa aag gtt      720
89 Pro Gly Asn Asn Val Ser Leu Thr Val Pro Gln Gly Gly Glu Lys Val
90 225                 230                 235                 240
92 acc ttt acc tat att cca tct acc aac cag gta ttc gat agc gtc aat      768
93 Thr Phe Thr Tyr Ile Pro Ser Thr Asn Gln Val Phe Asp Ser Val Asn
94             245                 250                 255
96 cat cct aac caa gca ttc cct aca tcc tca gca ggg gtc cag aca aat      816
97 His Pro Asn Gln Ala Phe Pro Thr Ser Ser Ala Gly Val Gln Thr Asn
98             260                 265                 270
100 tta gtc caa ttg act tta gcg agt gca ccg gat gtc acc cat aat tta      864
101 Leu Val Gln Leu Thr Leu Ala Ser Ala Pro Asp Val Thr His Asn Leu
102         275                 280                 285
104 gat gta gca gca gac ggt tac aaa gcg cac aat att tta cca agg aat      912
105 Asp Val Ala Ala Asp Gly Tyr Lys Ala His Asn Ile Leu Pro Arg Asn
106     290                 295                 300
108 gtt tta aat ctg ccg cgg tat gat tat agt gga aat gat ttg ggt aat      960
109 Val Leu Asn Leu Pro Arg Tyr Asp Tyr Ser Gly Asn Asp Leu Gly Asn
110 305                 310                 315                 320
112 gtt tat tca aag gat gca aca tcc ttc cgg gta tgg gct cca aca gct     1008
113 Val Tyr Ser Lys Asp Ala Thr Ser Phe Arg Val Trp Ala Pro Thr Ala
114             325                 330                 335
116 tcg aat gtc cag ttg ctt tta tac aat agt gag aaa ggt tca ata act     1056
117 Ser Asn Val Gln Leu Leu Leu Tyr Asn Ser Glu Lys Gly Ser Ile Thr
118         340                 345                 350
120 aaa cag ctt gaa atg caa aag agt gat aac ggt aca tgg aaa ctt cag     1104
121 Lys Gln Leu Glu Met Gln Lys Ser Asp Asn Gly Thr Trp Lys Leu Gln
122     355                 360                 365
124 gtt tct ggt aat ctt gaa aac tgg tat tat cta tat caa gtc aca gtg     1152
125 Val Ser Gly Asn Leu Glu Asn Trp Tyr Tyr Leu Tyr Gln Val Thr Val
126 370                 375                 380
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128 aat ggg aca aca caa acg gca gtt gat cca tat gcg cgt gct att tct    1200
129 Asn Gly Thr Thr Gln Thr Ala Val Asp Pro Tyr Ala Arg Ala Ile Ser
130 385             390             395             400
132 gtc aat gca aca cgc ggt atg att gtg gac cta aaa gct acc gat cct    1248
133 Val Asn Ala Thr Arg Gly Met Ile Val Asp Leu Lys Ala Thr Asp Pro
134             405             410             415
136 gca ggg tgg cag gga gat cat gaa cag aca cct gcg aat cca gta gat    1296
137 Ala Gly Trp Gln Gly Asp His Glu Gln Thr Pro Ala Asn Pro Val Asp
138             420             425             430
140 gaa gtg att tat gaa gcg cat gta cgc gat ttt tcg att gat gct aat    1344
141 Glu Val Ile Tyr Glu Ala His Val Arg Asp Phe Ser Ile Asp Ala Asn
142             435             440             445
144 tca ggt atg aaa aat aaa ggg aag tat tta gcg ttt aca gag cat gga    1392
145 Ser Gly Met Lys Asn Lys Gly Lys Tyr Leu Ala Phe Thr Glu His Gly
146     450             455             460
148 aca aaa gga ccg gat cat gta aag aca ggt att gat agt ttg aag gaa    1440
149 Thr Lys Gly Pro Asp His Val Lys Thr Gly Ile Asp Ser Leu Lys Glu
150 465             470             475             480
152 ttg ggc atc acc act gtt caa ttg caa cct gtt gag gag ttt aac agt    1488
153 Leu Gly Ile Thr Thr Val Gln Leu Gln Pro Val Glu Glu Phe Asn Ser
154             485             490             495
156 att gat gag acc cag cct gat acg tat aac tgg ggc tac gat cca agg    1536
157 Ile Asp Glu Thr Gln Pro Asp Thr Tyr Asn Trp Gly Tyr Asp Pro Arg
158             500             505             510
160 aac tat aac gta cca gag gga gct tat gcc aca act cca gaa gga aca    1584
161 Asn Tyr Asn Val Pro Glu Gly Ala Tyr Ala Thr Thr Pro Glu Gly Thr
162             515             520             525
164 gcg cgt ata aca gaa tta aag caa tta att caa agc ctt cat cag cag    1632
165 Ala Arg Ile Thr Glu Leu Lys Gln Leu Ile Gln Ser Leu His Gln Gln
166     530             535             540
168 cgg att ggt gtc aat atg gat gtt gtt tat aac cat acc ttt gat gtg    1680
169 Arg Ile Gly Val Asn Met Asp Val Val Tyr Asn His Thr Phe Asp Val
170 545             550             555             560
172 atg gtt tct gat ttt gat aaa att gtc ccg caa tat tat tat cgt acc    1728
173 Met Val Ser Asp Phe Asp Lys Ile Val Pro Gln Tyr Tyr Tyr Arg Thr
174             565             570             575
176 gat agt aat ggc aat tat acg aac gga tca ggt tgc ggc aat gaa ttc    1776
177 Asp Ser Asn Gly Asn Tyr Thr Asn Gly Ser Gly Cys Gly Asn Glu Phe
178             580             585             590
180 gcg act gag cat cca atg gca caa aag ttt gtg ctt gat tca gtt aat    1824
181 Ala Thr Glu His Pro Met Ala Gln Lys Phe Val Leu Asp Ser Val Asn
182             595             600             605
184 tat tgg gta aat gag tac cac gtg gat ggc ttc cgt ttt gac tta atg    1872
185 Tyr Trp Val Asn Glu Tyr His Val Asp Gly Phe Arg Phe Asp Leu Met
186 610             615             620
188 gct ctt tta gga aaa gac acg atg gca aaa ata tca aac gag ctg cat    1920
189 Ala Leu Leu Gly Lys Asp Thr Met Ala Lys Ile Ser Asn Glu Leu His
190 625             630             635             640
192 gcc att aat cct ggt att gtt tta tat gga gaa cca tgg act ggc ggc    1968
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Input Set : A:\pto.vsk.txt
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193 Ala Ile Asn Pro Gly Ile Val Leu Tyr Gly Glu Pro Trp Thr Gly Gly
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196 aca tcg gga tta tct agc gac cag ctt gta acg aag ggt caa caa aag    2016
197 Thr Ser Gly Leu Ser Ser Asp Gln Leu Val Thr Lys Gly Gln Gln Lys
198             660             665             670
200 gga tta gga att ggc gtt ttc aac gat aat ata cgt aat ggg ctc gat    2064
201 Gly Leu Gly Ile Gly Val Phe Asn Asp Asn Ile Arg Asn Gly Leu Asp
202             675             680             685
204 ggg aac gtg ttt gat aaa acg gca caa ggc ttt gca aca gga gat cca    2112
205 Gly Asn Val Phe Asp Lys Thr Ala Gln Gly Phe Ala Thr Gly Asp Pro
206         690         .       695             700
208 aac cag gtg gat gtc att aaa aat gga gta atc ggt agt att caa gat    2160
209 Asn Gln Val Asp Val Ile Lys Asn Gly Val Ile Gly Ser Ile Gln Asp
210 705             710             715             720
212 ttt act tca gca cct agc gaa acg att aac tat gtt aca agc cat gat    2208
213 Phe Thr Ser Ala Pro Ser Glu Thr Ile Asn Tyr Val Thr Ser His Asp
214             725             730             735
216 aac atg acg ctt tgg gat aaa att tta gca agt aat cca agt gac act    2256
217 Asn Met Thr Leu Trp Asp Lys Ile Leu Ala Ser Asn Pro Ser Asp Thr
218             740             745             750
220 gag gct gac cga att aaa atg gat gaa ttg gca cat gcc gta gta ttc    2304
221 Glu Ala Asp Arg Ile Lys Met Asp Glu Leu Ala His Ala Val Val Phe
222             755             760             765
224 act tca caa ggt gta cca ttt atg caa ggt gga gaa gaa atg ctg agg    2352
225 Thr Ser Gln Gly Val Pro Phe Met Gln Gly Gly Glu Glu Met Leu Arg
226         770             775             780
228 aca aaa ggc gga aat gat aac agt tat aac gct gga gat agt gtg aat    2400
229 Thr Lys Gly Gly Asn Asp Asn Ser Tyr Asn Ala Gly Asp Ser Val Asn
230 785             790             795             800
232 cag ttc gac tgg tca aga aag gcg caa ttt aag gat gtt ttt gac tac    2448
233 Gln Phe Asp Trp Ser Arg Lys Ala Gln Phe Lys Asp Val Phe Asp Tyr
234             805             810             815
236 ttt tct agt atg att cat ctt cgt aat cag cac ccg gca ttc agg atg    2496
237 Phe Ser Ser Met Ile His Leu Arg Asn Gln His Pro Ala Phe Arg Met
238             820             825             830
240 acg aca gcg gat caa att aaa cag aat ctt aca ttc tta gaa agc cca    2544
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242             835             840             845
244 aca aac acg gta gct ttc gag tta aag aat tat gca aac cat gat aca    2592
245 Thr Asn Thr Val Ala Phe Glu Leu Lys Asn Tyr Ala Asn His Asp Thr
246     850             855             860
248 tgg aaa aat ata att gtc atg tat aac cca aat aag act tcc caa acc    2640
249 Trp Lys Asn Ile Ile Val Met Tyr Asn Pro Asn Lys Thr Ser Gln Thr
250 865             870             875             880
252 ctt aat cta cca agt gga gat tgg acc att gta gga ttg gga gat caa    2688
253 Leu Asn Leu Pro Ser Gly Asp Trp Thr Ile Val Gly Leu Gly Asp Gln
254             885             890             895
256 ata ggt gag aaa tca tta ggg cat gta atg ggt aat gtt caa gta ccg    2736
257 Ile Gly Glu Lys Ser Leu Gly His Val Met Gly Asn Val Gln Val Pro
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                  Input Set : A:\pto.vsk.txt
                  Output Set: N:\CRF3\03072002\J069040.raw
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281        35               40               45
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288 Ile Val Arg Lys Asn Asp Trp Ser Glu Lys Asn Thr Pro Asn Asp Leu
289 65               70               75               80
292 His Ile Asp Leu Ala Lys Gly His Glu Val Trp Ile Val Gln Gly Asp
293            85               90               95
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301            115              120              125
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305        130              135              140
308 Ile Asp Lys Thr Thr Gly Glu Lys Ile Pro Val Thr Ser Ala Val Ser
309 145              150              155              160
312 Ala Asn Pro Val Thr Ala Val Leu Val Gly Asp Leu Gln Gln Ala Leu
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316 Gly Ala Ala Asn Asn Trp Ser Pro Asp Asp Asp His Thr Leu Leu Lys
317            180              185              190
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321            195              200              205
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325        210              215              220
328 Pro Gly Asn Asn Val Ser Leu Thr Val Pro Gln Gly Gly Glu Lys Val
329 225              230              235              240
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336 His Pro Asn Gln Ala Phe Pro Thr Ser Ser Ala Gly Val Gln Thr Asn
337            260              265              270
340 Leu Val Gln Leu Thr Leu Ala Ser Ala Pro Asp Val Thr His Asn Leu
341        275              280              285
344 Asp Val Ala Ala Asp Gly Tyr Lys Ala His Asn Ile Leu Pro Arg Asn
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348 Val Leu Asn Leu Pro Arg Tyr Asp Tyr Ser Gly Asn Asp Leu Gly Asn
349 305              310              315              320
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VERIFICATION SUMMARY                          DATE: 03/07/2002
PATENT APPLICATION:   US/10/069,040          TIME: 15:35:10

Input Set  : A:\pto.vsk.txt
Output Set: N:\CRF3\03072002\J069040.raw

L:13 M:270 C: Current Application Number differs, Replaced Current Application Number
L:14 M:271 C: Current Filing Date differs, Replaced Current Filing Date